



*A few Additional Suggestions, with a view to the Improvement of
Hospitals for the Sick and Wounded.*

By MR. JOHN ROBERTON.

[Read March 31st, 1858.]

IN a former Paper, on defects in the construction and ventilation of English Hospitals, read March 20th, 1856,* I endeavoured to shew that the insalubrity of a number of our Hospitals arises mainly from two causes — first, the difficulty, owing to faulty construction, of securing a free circulation through the wards, and a continual renewal therein, of the external atmosphere; and second, the intimate connection existing between the different wards in each storey by means of doors and passages, and between the different storeys by inside stairs — an arrangement which favours the rapid diffusion over the house of the foul air generated in any one of the wards, and consequently the creation of an Hospital atmosphere. I further attempted to shew that, by adopting a plan of construction such as may be seen in the beautiful Hospital at Bordeaux — the structure which has supplied a model for the best Hospitals in Paris and Brussels — all the difficulties hitherto experienced in English Hospitals, with reference both to the ventilation and to the proper isolation of every single ward, may easily be surmounted.

* Reprinted in the form of a Pamphlet (including the lithographed sketch of the ground plan of the Bordeaux Hospital) from the Transactions of the Manchester Statistical Society, May following, and forwarded to the medical officers of the London Hospitals; to the heads of the Army medical department; to the officers of the General Board of Health, &c.

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Moreover, in the Paper referred to, I took occasion to state that, though so-called "scientific" modes of ventilation by fans, pumps, flues, pipes, and furnaces may answer in saloons and public offices, they fail when applied to an Hospital, for the purification of which, and the maintenance of whose purity, no description of ventilation ever has, or, I venture to think, ever will be found to answer, excepting *that* by means of properly contrived lateral windows, other kinds of openings facing each other in the walls, and open fire places.

As exception has been taken to my comments on what is called "scientific" ventilation,* I beg to observe that I have little to say regarding it, unless as applied to Hospitals; but I here repeat what I formerly stated, that so wide is the difference between the wants of a ward filled with the sick and wounded with respect to ventilation, and the wants of every other kind of apartment in which people in health congregate or lodge, that the means which are found sufficient to maintain the purity of the one fail in maintaining the purity of the other; and an architect who has not submitted to make himself familiar with the state of the atmosphere in, for example, the crowded wards of a badly constructed Hospital at those hours of the day and night when the admission or the exclusion of air is left to the nurse and patients, is ill qualified to form an opinion on ward ventilation. Until the architect will consent to give his organ of smell a few minutes' practical training, about six or seven o'clock in the morning, in a crowded surgical ward, he can never realize the importance of a truth, which can hardly be enunciated with too great emphasis—that not merely must a ward, if it is to be kept sweet, be ventilated in the ordinary sense of that term, but it must be so ventilated as to secure for it *the constant renewal of the contained air*—the displacement of the foetid effluvia ever being emitted from the bodies of the sick

* See a letter in the *Builder*, No. 759, page 485. The editor of that valuable periodical, however, I am happy to observe, understands the *true science* of ventilation, and is rendering, from time to time, important service to humanity by his articles on the subject.

and wounded, and the substitution instead, of air, not drawn from cellars, corridors, and passages, but admitted direct from the store of the unpolluted heavens.

Moreover, it should not be forgotten, when the purification of an Hospital is under consideration, how liable "scientific" modes of ventilation are to disappoint, owing to derangements occurring in some of the valves, pipes, or other parts of the apparatus; insomuch that the most renowned inventions of this sort are ever being pronounced failures, and so given up. Nature's ventilation—the unceasing flow, parallel to the earth's surface, of the atmospheric tide—may be depended upon. Only let there be openings, facing one another, in the side walls of an apartment, and a through current of air never ceases: it flows on with the same certainty that may be predicated of the law of gravity itself. That man's ventilation is less worthy of dependence, the following instances may help to show:—

In 1853, I had occasion to visit, with a friend, one of our county jails. We entered a vast covered court, round which, in a succession of storeys, were galleries leading to the cells. After gazing about for a little I asked the governor to take me into a cell. He replied, "I may as well warn you that you will find the cells close and unpleasant." On entering one, I said, "This is indeed bad! have you no means of ventilation?" He answered, "Yes; we have a furnace at the top of the jail, and, in connection with it, tubes, the mouth of one of which is in every cell,—you see one here; but, somehow, it don't act well. When a cell becomes very close, I take a pane from the window and make a counter opening over the door, and then it is better." The Governor, it is plain, had small faith in the furnace at the top of the jail. One Christmas Eve, a few years ago, I had to see, professionally, a member of the House of Commons just come off his journey from London, who told me that he had been at a lengthy sitting the preceding night, and that the closeness of the House had very much exhausted him. I said, "Is the air, when you have a full House, and have sat long, disagreeable and close?" "The air close!" he replied;

“one may *taste* it.” “Have you not the finest, most costly ‘scientific’ ventilation?” I asked. “Yes,” he replied, sarcastically, “when the weather permits the windows to be opened, *then* we have *good* air.”

It may here be proper to say a word on the cause and the prevention of draughts in a ward, for the subject is very little understood. Suppose, on a calm day, the tops of the windows facing each other in the side walls to be open, there will be no draughts, because the air, as it enters at one side, displaces at the same instant an equal volume of air on the other side, and that without sensible agitation of the atmosphere in the apartment; but, let the windows on one side be shut, and those opposite remain open, and immediately there are draughts. The through circulation having been interrupted, the external air, as it flows into the apartment, mingles with air of a higher temperature than itself, condenses it, and thus produces eddies and currents which are anything but agreeable to the feelings of persons exposed to them. A lady, a zealous Sunday School teacher, once complained to me of the oppressive state of the air in the school. On inquiry, I found that the ceiling was low, and that the room was crowded with scholars, but that there were windows on the opposite side walls. I recommended that a pane of glass should be taken from the top of each window, and replaced by a finely perforated zinc plate, which was done, and the change that followed was all that could be desired—teachers and scholars alike were delighted with the freshness of the air, and I was assured that there was no draught whatever. Soon afterwards I met a friend who had been at an evening meeting in the school room, and who informed me that the place was very draughty. I inquired if there were window blinds, and if these had been drawn on one or on both sides. He replied that there were window blinds only on the side towards the street, and that *they* were drawn. I explained to him that the draughts arose from their having lessened the communication with the external air on one side, and left it free on the other, and that if they would have blinds on both sides alike, or no

blinds at all, there would no longer be draughts. It is important, also, to know that the openings in the external walls should directly face each other; that these openings should be the same in dimensions; and, if filled with zinc plates, that the apertures in the plates should be alike in size. Without attention to these simple rules, through ventilation will be less agreeable to the sick than it might be.*

My estimation of the value of these views concerning natural ventilation was strengthened and confirmed in the course of a tour that I made last summer in Belgium and parts of Germany. In the Hospitals of Ghent, Antwerp, and Liege, which are all two centuries old or upwards, I found the wards in every instance ventilated by windows facing each other in the side walls; when the wards were more lofty than common I observed, sometimes, two rows of windows one over the other in the opposed side walls; and in no case did I see a ward traversed by a corridor or divided longitudinally by a partition, so that *through* ventilation might always be obtained by windows and apertures. Considering the antiquity of these Hospitals—that of Liege dates from 1602—I could not but feel pleased with their construction; as I was, too, for the most part, with the other arrangements for the benefit of the sick. Not that the wards were, in every instance, separated in such a manner as to prevent injurious inter-communication by passages and stairs;

* The first notable instance of through ventilation that I remember to have seen was a number of years ago, in the Kilkenny Workhouse. The house was pretty full, yet not so crowded as it had at one time been. I asked to look at the dormitories. On entering one—a men's—I saw a long, lofty apartment, of no great width, with a row of beds on either side, windows facing one another in the side walls, and not far from the ceiling between each opposed pair of windows a transverse opening in the wall, perhaps six inches in breadth, filled with a plate of finely perforated zinc. I was startled at this free, continual admission of the air immediately over rows of beds, and asked the Governor if the people who slept there did not take cold. "No;" he replied, "I never heard of their taking cold: but two or three years ago, when we had many more in than at present, they used to lie packed as thick as herrings, almost, and could not have lived without plenty of air." The new Irish workhouses are planned with much good sense and skill, and they well deserve a visit from the curious tourist. Our barrack architects, too, might find them worthy of a visit.

nor that the *latrines* were always well placed in relation to the wards, or well ventilated; nor that the cubic air space was always what it ought to be; but my meaning is, that, comparing these ancient Institutions with the Infirmarys in our own large towns, most of which have been erected within a century, I could not but be struck with the inferiority, in nearly every respect, of the latter.* On proceeding northwards through Germany I was soon made aware that, in leaving Belgium, I had made a descent from a high to a somewhat lower social condition; so far, at least, as we might judge by the intelligence displayed in the construction of Hospitals. In the new one at Cologne, built to accommodate 600 sick, I first saw that plan of construction, found in every Hospital I subsequently visited—in Hanover, Hamburgh, Berlin, Dresden, Leipsic, Frankfort, and Bonn, and which seems peculiar to Germany. The building is of two or three storeys, and, when large, it forms three sides of a square. The wards in each storey range within the outer wall, and behind the wards there is a corridor: it follows that a ward, bounded thus behind by the corridor wall, and, laterally, by partitions which separate it from the wards on either side, will derive its light and air mainly from the windows in the front or outer wall. True, in the wall of the corridor is a door, and sometimes over this door a window, but these contribute little to the ventilation; and, as a ward is always deeper, from front to back, than it is transversely, and as a through current cannot be obtained, good—that is, sufficient—ventilation is next to an impossibility. There is another evil in a number of the Hospitals, which I saw with surprise: in the side walls are doors that open into the ward on either hand, thus establishing a direct inter-communication among all the wards in a wing—

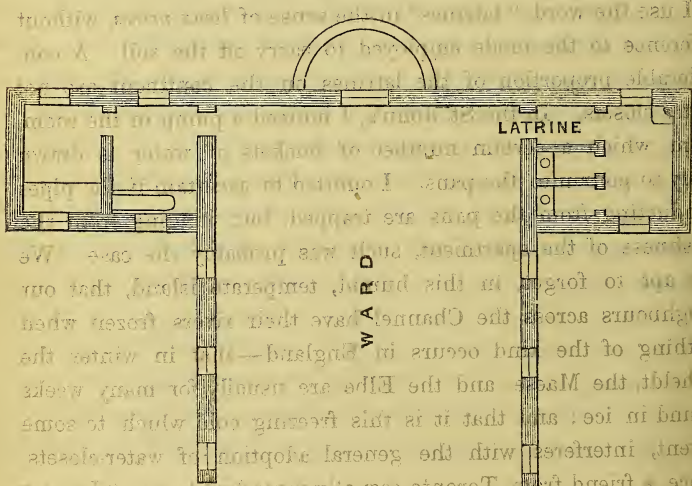
* Some of the wards in the Belgian Hospitals are too wide. One in the Hospital at Ghent was of great width, and contained, longitudinally arranged, six rows of beds; but then the windows in the opposite side walls were very lofty, and there was a vast arched roof, in form not unlike one of our railway sheds. The wards in the Bordeaux Hospital, with reference to width and height, and to the number, position, and size of the windows, supply, perhaps, our best model—certainly the best I have yet seen.

let only one ward be foul, and the other wards are sure to partake of the impurity. When a ward happened to contain little more than half the number of patients it was intended to lodge, one's sense of smell, possibly, received no shock; but, with the full number of patients, it was generally otherwise. Indeed, judged by this test, a visitor would be sure to complain of the state of the atmosphere;—a state of impurity, however, arising not alone from the obstruction, by the corridor, of through ventilation, but in part from other bad arrangements which I proceed to notice.

Nothing, perhaps, exhibits more strikingly the errors of Hospital architects than the bad position of the latrines, and the faulty methods devised for their ventilation. I was particularly struck with this some years ago, when looking through an Infirmary which had been only a short time opened. The wards in each storey were four—two on either side of a corridor—and at the gable end of every ward was a water-closet, entered directly by a door from the ward: in the closet, facing this door, was a window open at the top, and, under the window, the seat. It follows that when any offensive matter was dropped or poured into the pan, the air draught from the window, the instant the door was opened, would waft the effluvia into the ward! Had a prize been offered for the worst description of latrine with reference to position and ventilation—for a latrine the most surely fitted to pollute a ward—human ingenuity could hardly have hit upon one more faulty. Now, in a number of the German Hospitals the latrines are as objectionable as the above; for example, in several Hospitals one sees a latrine erected in a corner of the ward; while, in others, a common night chair stands between each pair of beds.* In addition to these two

* My friend Mr. R. Johnson, who lately paid a visit to the Hotel Dieu, Lyons, writes me that he found "night chairs, curtained off, one in each ward, and emptied once a day"—a most disgusting arrangement. Provided, however, that night chairs were fitted up as portable water-closets, and carefully seen to by the nurses, such night chairs might be a great convenience and benefit to the sick. Still, without attentive nursing, night chairs in wards must be an evil.

kinds of ward conveniences there is in general a large common latrine in each wing adjoining to and entered from the corridor, having a window facing the entrance, so that the cold air from the open window necessarily carries the effluvia from the latrine first into the corridor, and thence again by the doors into the wards. In none of the German Hospitals which I inspected were the latrines properly placed or well ventilated; in most they were decidedly bad: whereas in Belgium—to say nothing of the St. John's Hospital, Brussels, which is a model in certain respects for its latrines—I do not recollect one of the old Hospitals in which the latrines were placed within the wards;—in two instances they were in an adjoining garden, near to, yet sufficiently separated from the building to prevent any impurity finding its way into the wards.



SKETCH OF THE OUTER HALF OF A WARD IN THE
ST. JOHN'S HOSPITAL, SHOWING HOW THE
LATRINE IS VENTILATED.

In regard to *position*, the latrines ought to be joined with the ward so that the sick can pass into them without risk of taking cold, and so placed as to have no ventilating communication with the ward. Now the reader will see in the ward plan of the St. John's Hospital, that the latrine is entered from the ward by two doors, an inner and an outer, and that the latrine forms a separate building. With reference to purification, he will observe that the seats are against the outer wall of the ward, and that the position of the two latrine windows, supposing them open at the top, secures a through ventilation of the apartment, and that, too, (which is all important) in a direction at right angles with the passage from the ward, into the latrine. I do not see how it would be possible to improve upon this plan as respects position and ventilation. The apartment, I ought to say, is large and lofty, having windows the same in form and height as those in the ward.

I use the word "latrines" in the sense of *lieux privés*, without reference to the mode employed to carry off the soil. A considerable proportion of the latrines on the continent are not water closets. In the St. John's, I noticed a pump in the room, from which a certain number of buckets of water is drawn daily to pour into the pans. I omitted to ascertain if the pipes conducting from the pans are trapped, but, judging from the freshness of the apartment, such was probably the case. We are apt to forget, in this humid, temperate island, that our neighbours across the Channel have their rivers frozen when nothing of the kind occurs in England—that in winter the Scheldt, the Maese, and the Elbe are usually for many weeks bound in ice; and that it is this freezing cold which, to some extent, interferes with the general adoption of water-closets. Once, a friend from Toronto casually remarked to me, "I never saw a water-closet till I came on board the English steamer." "What!" was the reply, "have you no water-closets in Canada?" "No; our climate forbids." However, let the latrine be a water closet, or only a pan and pipe cleansed by the water bucket (and for an Hospital the self-acting water-closet is ever to be preferred)

the pipe, in either case alike, ought to be trapped, and strict attention given, from time to time, to ascertain that the drain is clear.

Capped tubes, penetrating the walls a few inches from the floor, are used in continental Hospitals for the occasional ventilation, or, more correctly, for the occasional flooding with air of a particular part of a ward. This contrivance I noticed for the first time in the Hôpital de Bavier, Liege. Every surgeon knows, when the dressing is removed from a burn, a wound, an ulcer, or an abscess, that, sometimes, the fœtor is intolerable; and the same will happen in certain states of disease, when the patient is on the bed pan. Now, it is in such circumstances, by uncovering the mouth of a tube four inches in diameter, communicating, near the floor, with the external atmosphere, that the locality is instantly flooded with fresh air, and that, too, at so low a level as not to incommode the patient; when a tube in the opposite wall is at the same moment uncovered, the flood of air is such as allows of both tubes being speedily closed.

I am opposed to the use of gas on account of the glare it causes, as well as of the risk of escape into the ward through defects in pipes or burners; but there can be no objection to a single gas jet in the nurses' room, for convenience sake. In Belgium and Germany I found no uniformity as regards the means of lighting; in a number of Hospitals oil lamps are alone used, in others gas; and in some, again, gas sparingly, along with oil lamps: I decidedly prefer lamps.

The material of which ward floors should be composed would be easily decided had we marble in such abundance as one sees in the Low Countries. In Holland, all the better class of shops are flagged with marble; and the lobbies, and even the steps of stairs in the houses of the opulent, are of beautiful polished marble. The first ward I entered in the St. Elizabeth Hospital, Antwerp, had a polished marble floor; but this did not extend to all the wards. At Cologne, too, some of the Hospital corridors were paved with marble. In the Hospital at Liege, the

floors were of oak, cleansed twice a day ; and unquestionably, saving marble, the best material for the flooring of wards is oak, painted, waxed, or varnished, as in the great Hamburgh Hospital, and, I think, in several more of the Hospitals I visited ; for it is easy to clean, and when moist can be speedily rubbed dry. The principle—which cannot be too strongly urged in reference to the floors, walls, and ceilings of Hospitals—is, that every kind of porous material ought to be avoided. If all the interior surfaces of an Hospital were of some material like glass, hard, smooth, and polished, so much the better for its sanitary condition.*

There is one important matter more cared for on the Continent than in this country—I refer to the means of recreation for the recovering sick and the convalescent ; a pleasant out-look when the sick are not able to go abroad, as on the balcony at the outer end of the ward in the St. John's Hospital ; and convalescent's rooms for meals ; reading-rooms and libraries ; terraces where they can walk, and take the air, and gardens in which, at certain seasons of the year, they may have the liberty to wander : nay, gardens into which the sick may be wheeled in their beds or couches,† and where, under the shade of trees, or under sheds erected for their special use, they can enjoy a sight of the heavens and breathe the external atmosphere. Who can think of this kind of enjoyment in a person so recently pining

* See, in the *Builder* of December 5th, 1857, page 799, a curious and interesting notice of "Water Glass," and its applications. This is a kind of cement having a powerful chemical attraction to mortar, brickwork, &c. drying quickly, being very durable, smooth, and hard, like glass. How far it may be found suitable for coating the walls of Hospitals, I do not venture to determine.

† My friend, Mr. P. H. Holland, late of the Board of Health, in a letter to me, remarks : "It is a great mistake to allow patients who can get up to spend the day in the sleeping wards. Nay, I much incline to have beds on wheels, so as, if possible, to empty the sleeping wards some part of every day, that all the windows might be thrown open."

on his mattress, it may be for weeks or months, without recalling the stanzas of Gray:—

“ See the wretch that long has toss’d

On the thorny bed of pain,

At length repair his vigour lost,

And breathe, and walk again:

The meanest floweret of the vale,

The simplest note that swells the gale,

The common sun, the air, the skies,

To him are opening Paradise.”

I shall not soon forget my feelings when, on leaving the great Charité Hospital, Berlin, I wandered on a warm, fine morning (September 4th, 1857) into its gardens behind, and came upon one of the patients, a sick man, on his bed, set under an apple tree, which spread over him its branches laden with fruit; nor, the pleasure I enjoyed a week previously, in walking through the gardens belonging to the Liege Hospital, whose Governors are amusingly provident for the recreation, but especially for the corporal wants, of the inmates. There you see courts adorned with trees in painted tubs, as at Versailles; fruit gardens, and an ample kitchen garden; six cows kept to furnish unadulterated milk; and poultry, I know not how many, for the supply of *fresh* eggs. But here in England we are too apt to forget these secondary yet most important means of restoring bodily health through the mind—of seconding medicine by what exhilarates and cheers the wasted and suffering. I formerly mentioned the flower gardens for the use of the sick, which separate each pair of pavilions in the Hospital at Bordeaux; and I here give a passage from the letter of a friend, written at Paris in 1855, describing the recreations provided for convalescents in the Hospital Lariboisiere:—“These several sweet Hospitals—[he refers to the separate pavilions of which the Lariboisiere consists] are built fifteen or twenty yards apart, and the space between them is a grass plot and garden, for the use of the patients when permitted to go out. The windows all looking into these

gardens, they are a source of continual pleasure to the patients. The advantages of this construction are so obvious that I will not weary you with naming them. The first floor in each block is the same as the ground floor, except that, as I have already stated, those who may take out-door exercise have to walk upon the corridor which looks upon the beautiful square with its garden beneath. The upper storey is the same, the patients coming down for out-door exercise. I was delighted to find a library and lecture-room for young convalescent patients. This is as it should be. There is a similar room for adult patients; and I remarked that in it rush-bottomed chairs took the place of forms and benches.”*

The drains from an Hospital demand the utmost care and good management—in particular that they be constructed so as easily to scour when flushed; that the main drain do not pass under the building; that every pipe from water-closet, lavatory, bath, nurses’ room, and kitchen, be trapped; and that these outfalls be inspected by some competent person at least twice a year. The mischiefs that may arise from a bad main drain I will illustrate by an example. Having occasion once to visit a jail in course of erection, on business with the master of the works, I observed, before entering, workmen busy constructing a main drain after the old fashion, that is to say, a culvert of common brick laid without cement, the bottom, of course, rough and uneven; and there being very little fall, no flushing, it was obvious, could scour it. I said to the master of the works, “If you are to have here six or seven hundred cells, and every cell its water-closet, will not this rude kind of drain lodge filth, and be continually sending back upon you its volumes of putrid effluvia?” He replied, “I have been saying the same thing, but the borough surveyor does not heed me. It was otherwise in the last jail I built, which had its main constructed thus: bricks cast to the proper curve, and set in cement, constituted

* From Mr. R. Johnson’s letter, giving an account of the Lariboisiere, referred to in my former Paper.

the bottom of the drain; and so smooth was it that a moderate flow of water sufficed to keep it clear." Subsequently, I learned from an officer belonging to the jail that they had been inundated with fœtid gas; that, after trapping the outfalls from every cell and closet, the gas still found a way into the building; and that it was only on discovering that they had overlooked the outfalls from the baths, and trapping these, that the bad smell ceased. It ought never to be forgotten that a badly-constructed drain is always a reservoir of poisonous gases, and also that it is liable to become gradually obstructed, until at length it is no drain at all.

The water used in an Hospital ought, of course, to be pure and good;* but what I would here advert to is the custom, so general in England, of using lead cisterns for storing water, especially where, as in many of our towns, the supply is intermittent. Such cistern water is always tainted with lead; not in quantity, it may be, to produce the distinguishing symptoms of lead poisoning, but enough to affect very injuriously the stomach and nervous system of persons habitually using it. From experience I can affirm that, if boilers in an Hospital are fed from a leaden cistern, and if taps, connected with these boilers, are placed so as to be convenient for nurses and other servants to draw from, the patients, instead of the wholesome prescribed water, will be certain to get the tainted; the tap that is the readiest will be ever the tap used.

An unhealthy Hospital will unquestionably exhibit a high rate of mortality; nevertheless it is an error to suppose that the death-rate is in every instance a correct test in reference to the sanitary state of an Hospital, since a high ratio of deaths will sometimes proceed from causes independent of this circumstance. Thus, for example, in a town where people are much employed in machine shops and foundries, the Hospital *there* will be sure

* On this subject the reader is referred to Dr. Snow on "Cholera, and the Water Supply in the South Districts of London." *British Medical Journal*, October 17th, 1857, page 84.

to receive a larger proportion of severe casualties—of cases likely to swell the death-rate—than will happen in another town where few are occupied in connection with machinery.

The first thing to be regarded in an inquiry into the good or bad sanitary condition of an Hospital is, perhaps, the health of the resident officers and nurses. If the atmosphere in the wards and passages is foul, it may be expected that persons attending on the patients will not enjoy vigorous health; and the truth of this test is confirmed by general experience. I remember, one night, when wandering through the wards of an excessively foul Hospital, in which were scenes of suffering that words would fail to pourtray, being particularly struck with the sickly look of the nurses and medical pupils: nor did this surprise me, for I felt that had I been obliged to remain in the building for only a single night, I should myself have been on the list of sick, solely as a consequence of the state of the atmosphere.

A second, and far more decisive test, however, is the tendency in wounds, received by accident or made by the knife of the surgeon, to heal speedily or otherwise—to heal, or not to heal, as quickly as would happen were the same cases treated singly in a commodious private house. And if an Hospital do not afford advantages equal to the best private dwelling, it is assuredly, to use the mildest term, a failure—I might, perhaps, without impropriety, say—a snare and a curse. Yet in how few of our Hospitals is it that compound fractures, amputations, the excision of large tumors, and the like, do not linger far longer than they would were they treated at home. The test referred to has never yet, I imagine, been applied to the results of Hospital practice, else it would have brought into open day a mass of harrowing evidence as to the weeks and months of suffering needlessly inflicted on multitudes of the most valuable members of almost every industrial community in England, who have had cause to bewail the evil fortune that sent them into an Hospital; to say nothing of the waste of Hospital funds, owing to the enormous enhancement of expense in the treatment of every such lingering case; for it would be wrong to overlook

the fact that perhaps every social evil, not excepting the present, admits of being estimated at its money value.*

In the recent Report on the sanitary condition of the army, and the organization of Military Hospitals, to which I shall have occasion before concluding particularly to advert,† we have, in the evidence of one of the witnesses, the following facts, with regard to the present sanitary condition of Guy's Hospital :—Sir James Clark asks, “Do cases of erysipelas occur in the wards?” The witness replies: “Very frequently in the surgical wards; not in the medical wards.”—Have you any cases of pyæmia?” “Yes; cases of pyæmia occur very frequently in the treatment of severe surgical operations, and render them very fatal.” Now, had the surgeons of a large proportion of the Hospitals in Great Britain and Ireland the same questions to answer, and were equally free and candid as this witness, what disclosures should we not have! Let us hope that, as the deadly barrack dormitories have at length found a Howard in Mr. Sidney Herbert, our civil Hospitals will ere long engage the attention of some person of sufficient influence to obtain a commission of inquiry with reference to their condition—an inquiry which, if honestly and thoroughly pursued, would disclose a mass of cruel yet remediable evils such as must speedily result in the pulling down and re-construction, on a better model, of a number of buildings long used, in the twilight of sanitary knowledge, as Hospitals, but which are now found to frustrate alike the most skilful efforts of medical science, and the purposes of humanity.

I had intended to touch on the condition of Lying-in

* When remarks are made as to the unhealthiness of an Hospital, at some particular season, the reply usually is that erysipelas is epidemic—that it is found to attack wounds and sores under treatment in private dwellings; but, on inquiry, the dwellings referred to are generally found to be cellars, or the sleeping rooms in back-to-back cottages, where a good sanitary condition of the apartments, supposing surgical cases treated there, is impossible.

† Report of the Commissioners appointed to inquire into the Regulations affecting the Sanitary Condition of the Army, the Organization of Military Hospitals, and the Treatment of the Sick and Wounded, with Evidence and Appendix: printed 1858; folio.

Hospitals—a subject to which recent disclosures concerning their insalubrity have drawn public attention;* but I content myself with a single observation. That a maternity ward, for the reception of certain rare cases in which imminent danger to the woman is apprehended, is desirable, may be conceded; but under ordinary circumstances poor women, I am persuaded, ought to have their confinements at home, since it is well known that the rate of mortality in child-bed, amongst the poor, even in large towns, is extremely small—much less than it is amongst the wealthy classes. An eminent London accoucheur, writing to me in the summer of 1856 with reference to Lying-in Hospitals, declares them to be “a scourge rather than a blessing”—a sentence the justice of which I fear cannot be disputed. I would, therefore, I repeat, supersede Lying-in Hospitals, by properly organized and well governed Charities for the delivery of poor women at their own homes.

I am gratified to notice in the Report of the commission before-mentioned—a volume in which is to be found the most valuable body of facts, as to the construction, ventilation, and economy of Hospitals, ever given to the public—that a number of the suggestions in my former Paper re-appear, more or less, in the evidence of several of the most eminent of the witnesses examined, especially in regard to the following points:—

1. *An Hospital atmosphere most effectually prevented by a building constructed in separate pavilions, and every ward occupying an entire storey:* concerning which Miss Nightingale expresses herself thus:—“The best principle of Hospital construction is that of separate pavilions placed side by side, or in line; the former is preferable. It diminishes the distance to traverse from block to block. The distance between the blocks should not be less than double the height. There should not be more than two flats to the block, nor more than one ward to each flat. For the purposes of administration, the building ought to be in a

* I refer to letters concerning the mortality in the General Lying-in Hospital, London, which lately appeared in the *Times*, and in some of the medical periodicals.

square, the ground storey connected all round by an arched corridor, with an open terrace above.”*

2. *Natural ventilation the best.*—These are Miss Nightingale’s views:—“The doors, windows, and fire-places should be the means of ventilation for such wards as these; nothing else is wanted. If an Hospital must be ventilated artificially it betrays a defect of original construction which no artificial ventilation can compensate; it is an expensive and inefficient means of doing that which can be done cheaply and efficiently by constructing your building so as to admit the open air around. There should be one or more open fire-places in the ward, but lofty, so that the throat of the chimney shall be above the patient’s head and bed. Our grandfathers’ lofty fire-places are the greatest loss in modern house architecture. The little low fire-places of this date bring the best current of air below the stratum in which we are breathing. With our system, to breathe the best air we must not be more than six years old, or we must lie down.”†

3. *The number, position, and height of windows in a ward for the purposes of ventilation and light.*—On these points Miss Nightingale expresses herself as follows:—“One window should be allotted for every two beds; the window to be not less than

* Report, page 380. Much to the same effect is the reply of one of the Commissioners, T. Alexander, Esq. C.B. p. 158. Miss Nightingale’s evidence, given in writing, in answer to written questions addressed to her by the Commissioners, and which occupies twenty-eight folio pages of the Report, will be read with profound attention. It well deserves to be printed by itself, and put into general circulation for the benefit of professional men, whether attached to the army or in civil life, but especially for the use of governors of Hospitals, and even for the instruction of architects. I confess I cannot help suspecting that the memorials presented to Lord Panmure in February and May, 1857, by the medical staff of the Middlesex Hospital, respecting the Royal Victoria Hospital at Netley; the debate subsequently on the same subject in the House of Commons; and the printing of the returns with reference to Netley Hospital, have greatly stimulated the Commissioners in the execution of their work, and rendered the report more interesting and instructive.

† Report, page 384. To the same purport essentially is Dr. Sutherland’s evidence.—(See page 224.)

four feet eight inches wide, within two or three feet of the floor, so that the patient can see out, and up to the ceiling. Windows are to be placed opposite each other. * * * No part of the ward ought to be dark. This is of the utmost importance in many cases. The light can always be modified for individual patients; but even for such patients to have light in the ward is not the less important."*

4. *Artificial heating of wards injurious.*—In answer to a question as to what is the best system of warming for an Hospital, she replies:—"Radiation; open fire-places." So, too, says Sir J. Liddell:—"I do not think that the hot air ever does—patients cannot endure it, it is so heavy, close, and exhausting."†

A properly constructed, well ventilated Hospital having been provided, we are, in a sense, only at the beginning of our work. Without enlightened administration—in other words, without skilful, vigilant nursing, the sanitary condition of the Hospital will speedily deteriorate, and success in the medical treatment of the sick and wounded be, in a great measure, frustrated. We are yet behind our Continental neighbours in the department of sick nursing. In our Hospitals we devolve the duties properly belonging to the skilled nurse on women, with few exceptions, of the lowest class, and who, it need hardly be said, are uneducated and untrained; whilst, on the Continent, the sick in Hospitals are, and long have been, in the care of educated women who have been trained, and who devote themselves to the duty of nursing from a sense of religion. When in the Hospital at Bordeaux, I remember being struck with the beautiful order that everywhere met the eye. The kitchen, the larder, the vast linen-room, the drug store, the laboratory, the dispensing-room, all in the hands of the sisters, presented a spectacle of neatness and order such as we should in vain look for in any of our Hospitals that I have chanced to visit. I have spoken somewhat disparagingly, perhaps, of the Hospitals in Germany; but I am constrained to

* Pages 381, 382.

† Page 384. See also Dr. Mapleton's objections to warmed air in an Hospital, page 145.

say that I had glimpses—(my visits being so short I dare not call them more)—in several instances of an organization for sick nursing that might deserve our study and imitation. In the Bethanien Hospital at Berlin, I saw some of the Protestant deaconesses, who had more, perhaps, the look and bearing of ladies of station than of nurses. I said to the friend who conducted me, “Do these fine women work? will they put their hand to everything, like an ordinary nurse?” “Yes,” he replied, “they wash, they clean, and perform every description of nurses’ work.” This information naturally made me curious to know more about the Bethanien Sisters, and I accordingly obtained from an eminent physician of that city, Dr. Otto Veit, the following brief account of them. “You must know,” writes Dr. Veit, “that the system of nursing in the Bethanien is founded on a religious basis, and that the Sisters are more subject, perhaps, to the Superior, who is a lady of rank, and to the Pastor, than they are to the physician. They do not receive wages, but have their living; and when they become old or incapable of nursing, the House takes care of them. These deaconesses enter at first as probationers for one year, during which they are taught how to nurse the sick and wounded,—the practical part by the elder sisters, the theoretical by the physicians; and, at the same time, they have to perform house work in connection with the kitchen, the laundry, and the like. When, at the end of a year, they are found to be serviceable, they are entered as novices, which means that they have all the rights and duties of the deaconesses, saving that they have not yet a title to the support of the House in case of invalidity. The length of the novitiate is not strictly defined, as it depends upon the will of the Superior, or chief sister, but it is seldom longer than two years; and then the novice takes the rank of sister, or deaconess. The Sisters, I may observe, have the whole administration and service of the Hospital in their hands, and do without the assistance of servants; for they keep clean the sick, make the beds, clean the windows, the rooms, and the water-closets, administer the prescriptions, and,

in a word, do everything for the benefit of the sick, according to the directions of the physician. Every Sister is over one room, with from eight to twelve patients, and near it is her little bed chamber. The night guard is kept by three Sisters, who, for a specified time—usually one month—are excused from service in the day, during which they have their time for sleep. The sisters, I need hardly remark, are under no obligation to remain longer than they choose, and are at liberty to marry. Their number, including probationers and novices, is fifty; and the sick under their care usually number about two hundred and forty.”*

On sick nursing, as practised abroad, I will give a brief extract from a letter of my friend Dr. Pincoffs,† Dresden, whose great experience in Hospital service, when civil physician in the East during the war, well qualifies him to speak on this subject. After an interesting sketch of the Protestant deaconesses’ institutions in Germany, especially those of the celebrated Pastor Fliedner, of Kaiserswerth, which I regret my limited space will not permit me to present, he thus proceeds:—“In Fliedner’s Institutions, the Sisters engage themselves from three to five years; they wear a peculiar costume. In the Institution in Dresden, as in others, they may leave at any time with a short

* In the Bordeaux Hospital, I was told, there were forty-seven Sisters, under a Superior, or head sister, and that the sick in the wards numbered about 550. The admissions annually are about 12,000.

† Dr. Pincoffs, in his work entitled “Experiences of a Civilian in the Eastern Military Hospitals,” gives some interesting details concerning the Russian Nursing Sisters, numbering about 88, who, he tells us, were indefatigable in their attentions to the wounded, not alone in the Hospitals, in the ambulances, and in the transports, but also in places close to the batteries where the wounded lay, and where several of these Sisters were hit by the shot. “Their duties” he says, “were strictly defined, and divided into three classes: one class dressed the wounded, another prepared and administered the medicines, and the third attended to the domestic work.” No publication on the medical history of the late war surpasses this of Dr. Pincoffs, in the variety and value of the information supplied. With reference to the French medical service, and the organisation of foreign medical schools and Hospitals, the matter given is, I believe, new to the English reader.

notice; they are at the head of the kitchen, laundry, and pharmaceutical departments; and for the latter they have a peculiar apprenticeship to serve. When a patient arrives they see him placed in bed, linen changed, &c.; they attend the *visite* with the doctor; are expected to give him information about the patients, the result of their own observation; to take his orders about food, and to see them executed. Before entering, they must give proof of possessing the necessary qualifications, as reading, writing, knowledge of biblical history, needlework, washing, &c.; and after admission they are taught the actual nursing. The establishment at Bethanien, Berlin, has nothing to do with Fliedner; the lady at the head is a Countess Stolberg, and the establishment is *chiefly* supported by the Royal Family."

It is an ascertained fact that, in all fully peopled countries professing the Christian faith, there are considerably more women than men above twenty years of age; and we may fairly assume that, as this is a law of nature, it is designed to answer beneficent ends in human society.* One of these ends, I doubt not, is sick nursing in Hospitals;—an occupation for which the female sex, when educated and trained, is found to be so well adapted. I fear that in England female philanthropy has not hitherto stepped forth and displayed itself so actively in this particular walk, as it has in some neighbouring countries; but a commencement, I am happy to know, has been made in the work, for several Institutions for the training of nurses exist in London, and are yielding, at the present time, good fruit. As events connected with the late war have given a powerful impulse in the direction referred to, let us hope that educated Englishwomen will, ere long—under a noble guide, whose name it is not even necessary for me to repeat—take a rank not inferior to that of the best of their sisters abroad, in the work of co-operating with medical science to render all our Hospitals—

* See "Thoughts on the Excess of Adult Females in Great Britain, with reference to its causes and consequences,"—a Paper read before this Society in 1840, and subsequently published in the *Edinburgh Medical and Surgical Journal*, vol. 54.

what I am afraid I dare not at present pronounce them to be—
asylums for the *cure* of the sick and wounded.

By the courtesy of a Committee of gentlemen at Blackburn, formed for the purpose of erecting an Infirmary there, I am favoured with a sketch of the first floor of the projected building, and also with permission to have it lithographed for our Transactions. The site selected for the Infirmary is, I learn, more than eight acres in extent, well elevated, so as to have good natural drainage, situated on the windward or south-west side of the town, and distant from it about half a mile. The structure is to consist of separate blocks, two floors in height, placed alternately at intervals of twenty feet, on opposite sides of a lofty corridor ten feet wide, running the entire length of the range, and opening at either extremity to gardens. By this arrangement a series of quadrangles is obtained, each sixty-five feet wide, and having twenty feet of well lighted and well ventilated corridor space on either side of a block. The blocks, extending forty-seven feet at right angles to the corridor, contain on each floor a ward of eight beds, and a room to be described presently. The ward, entered from the corridor, is thirty-nine feet in length, twenty-three in breadth, and sixteen feet high, giving a cubic-air space for each bed of 1,794 feet. The windows are five on either side, and reach to near the ceiling; whilst between the top of the window and the ceiling is a finely-perforated zinc plate communicating with the external air. At each end of the ward there is a fire-place having an opening five feet in height. On either side the fire-place farthest from the corridor are the scullery and bath-room, and beyond these, at the extremity of the floor, is the latrine. This, entered by two doors, an outer and inner, is of the same height as the ward, has through ventilation flowing at right angles with the door, and water-closets that are self-acting. In the scullery is a discharging shaft, by means of which fouled linen, fouled bandages, and the like, are passed at once to the basement.

The beds, the architect informs me, are to be of iron, on wheels six inches in diameter, by which contrivance the beds can be moved, when necessary, into the corridor. The flooring of the ward will be of Norwegian pine, waxed and polished; and the walls and ceilings are to be finished with Parian cement. Across the corridor, opposite each ward, is a room twenty-three feet by fourteen feet. One of these rooms on the male, and one on the female side—with two beds in each, and having a cubic air space of 2,576 feet per bed—are appropriated for special cases, such as severe sickness or accidents happening to domestic servants, and casualties in which separation from the sick ward is judged advisable. The remaining two rooms on either side supply a dining-room for convalescents, and a reading-room. Besides the well-aired corridor—divided at the centre by a barrier to separate males from females—in which convalescents may walk, there are the balconies; and also, opening from the corridor on either side the chapel, terraces, each twenty feet by fourteen feet, furnished with seats.

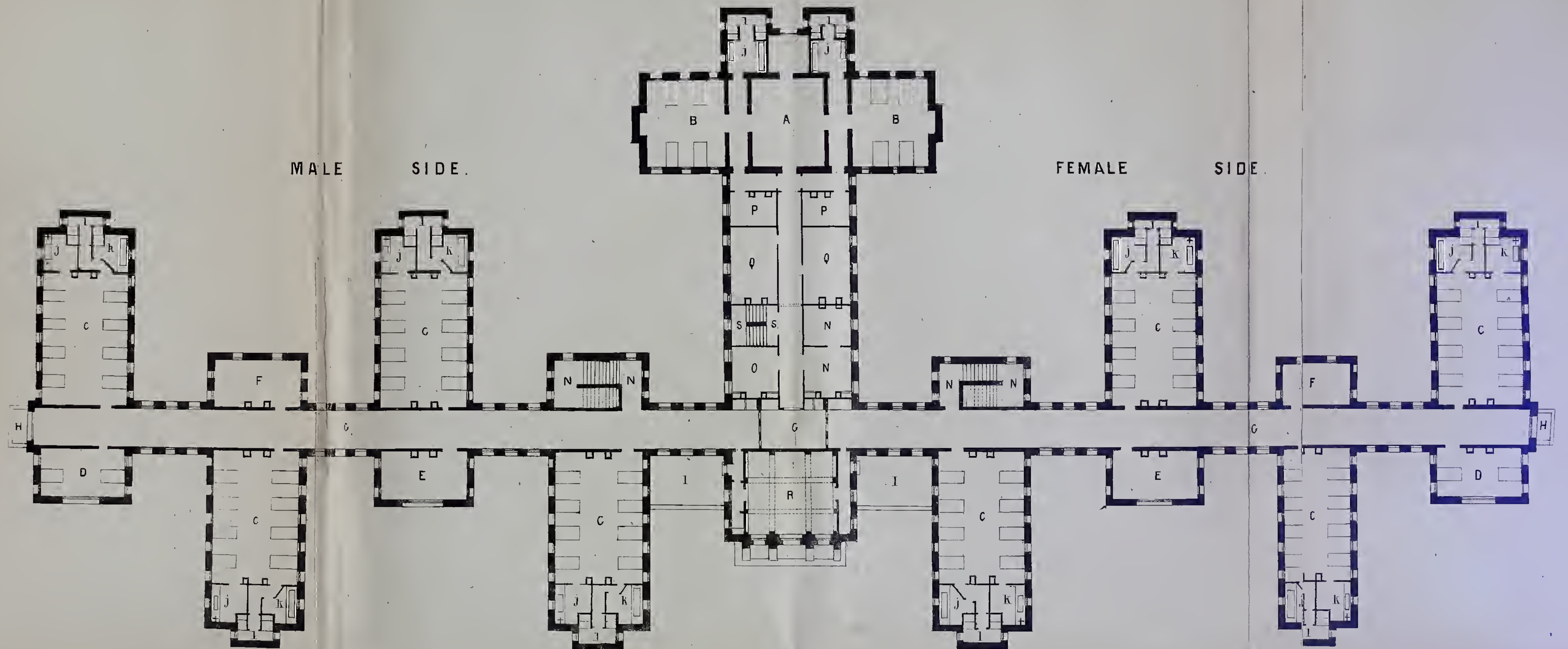
In the centre is the principal block, 32 feet wide, in which, besides the chapel and terraces, may be discerned the nurses' kitchen and other nurses' rooms; the operating-room, and the wards after operations; the latter containing eight beds, with a cubic-air space per bed of 2,044 feet. The architect informs me that he provides no artificial warming for the wards besides fire-places with ample openings, and that for summer, when fires are disused, there is to be a gas jet opening above the chimney-piece within the flue, by means of which he will ensure, even in the hottest season, an up-draught, and so maintain the purity of the air in the ward. I might, with the assistance of the architect, give a description of what is to be found on the ground storey, and in the basement, as well as in the attics; but as this would lead me into a minuteness of detail foreign to my present object, I forbear to do so. The sketch, incomplete though it be as affording only a view of the arrangements on one of the floors, will, I have little doubt, be studied with interest, especially at the present time, when the state of

Military Hospitals is exciting so much discussion, and, of course, is arousing many to inquire as to what may be the sanitary condition of our civil Hospitals. It is, perhaps, necessary for me to say that the Committee do not contemplate carrying out the whole of the design at once; and that the sketch shews what the first floor of the Infirmary is to be when completed—an event which will, probably, happen in the course of a few years hence.

EXPLANATION OF THE ACCOMPANYING PLAN OF THE
INTENDED HOSPITAL AT BLACKBURN.

- | | |
|------------------------------------|------------------------------------|
| A. Operating Room. | k. Bath Room. |
| B. Wards after Operations (male). | l. Latrine. |
| C. Sick Wards. | + Discharging Shaft in Scullery. |
| D. Rooms for Special cases. | N. Nurses' Sitting and Bed Rooms. |
| E. Dining Rooms for Convalescents. | O. Nurses' Kitchen. |
| F. Reading Rooms. | P. Nurses' Rooms in connexion with |
| G. General Corridor. | Operation Wards. |
| H. Balconies. | Q. Nurses' Dormitories. |
| I. Terraces, where Patients may | R. Chapel. |
| take the air. | S. Staircase from basement to |
| j. Ward Scullery. | domestic Dormitories. |

FIRST FLOOR PLAN.

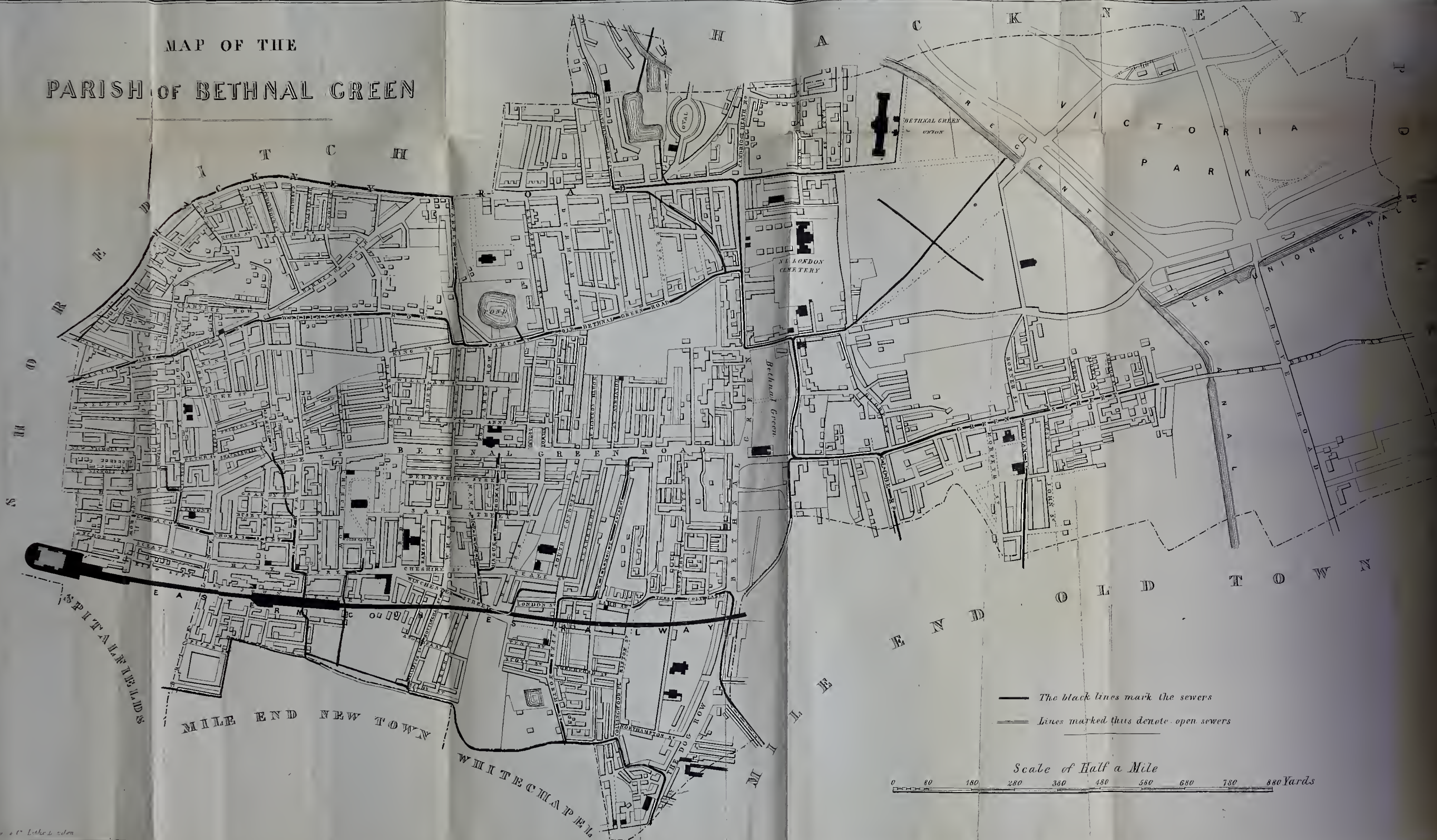


Scale of Feet



PROSPECTIVE PLAN OF INTENDED INFIRMARY BLACKBURN

MAP OF THE PARISH OF BETHNAL GREEN



— The black lines mark the sewers
 — Lines marked thus denote open sewers

Scale of Half a Mile
 0 80 160 240 320 400 480 560 640 720 800 880 Yards

